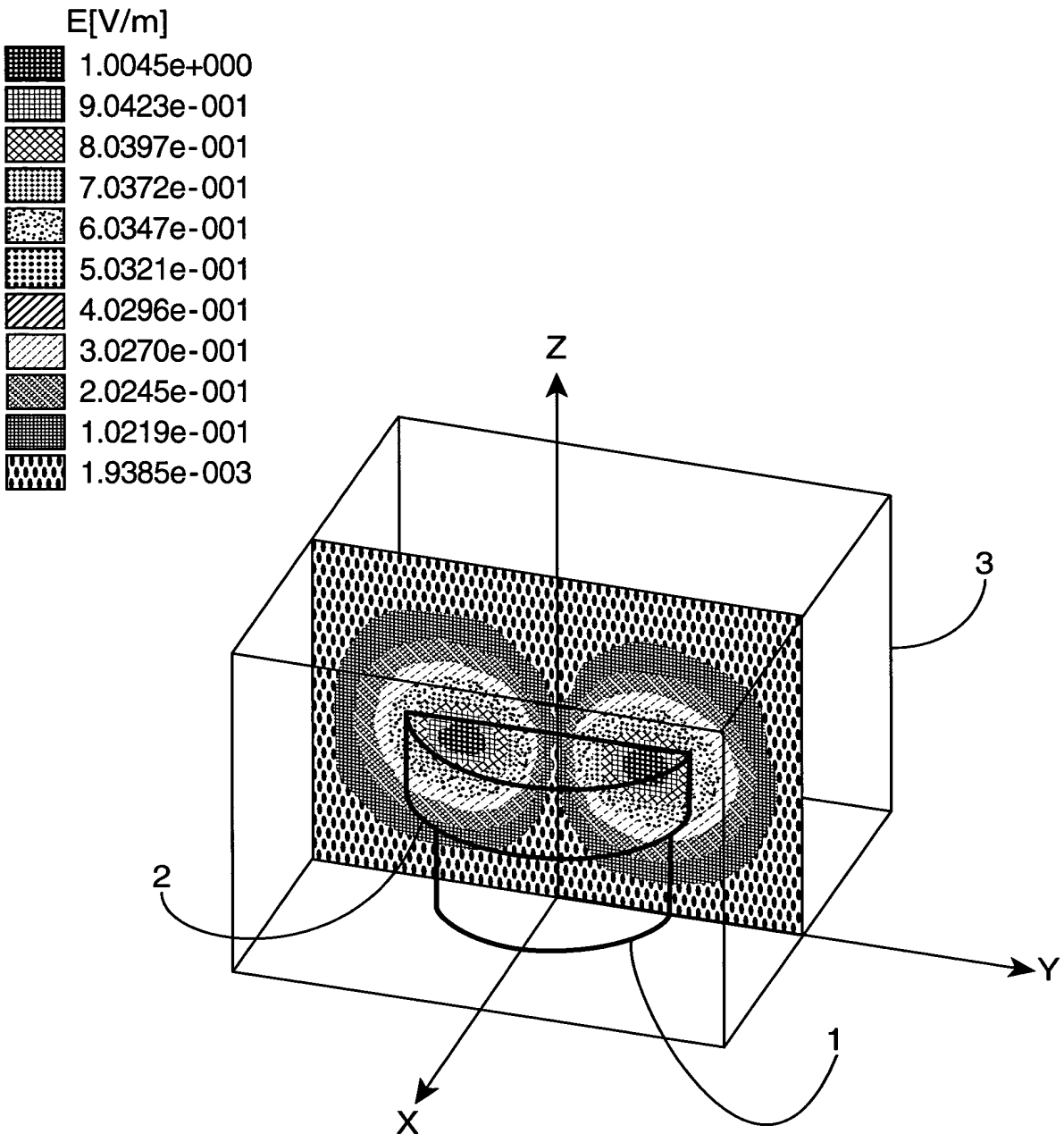


FIG. 1A
PRIOR ART

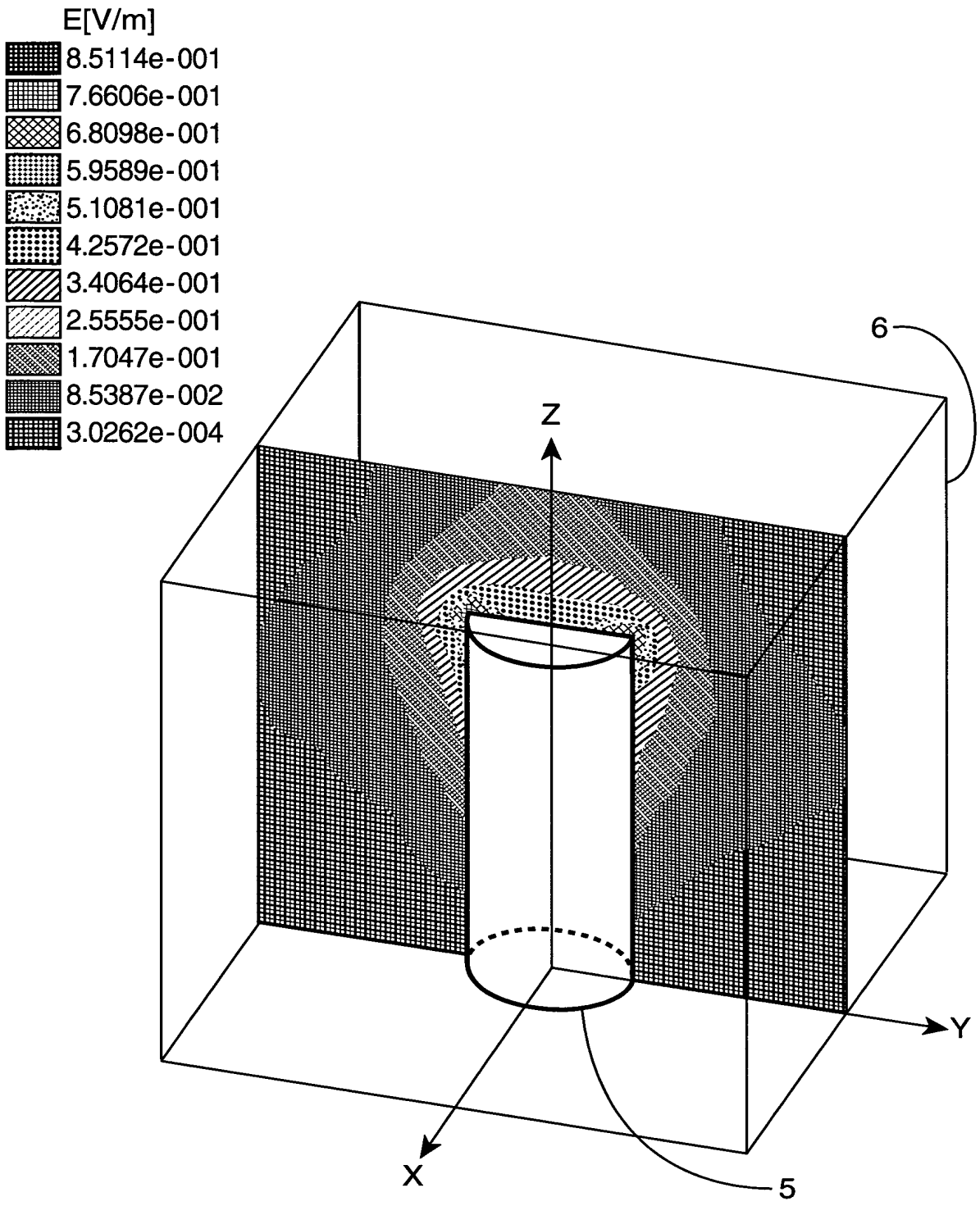


FIG. 1B
PRIOR ART

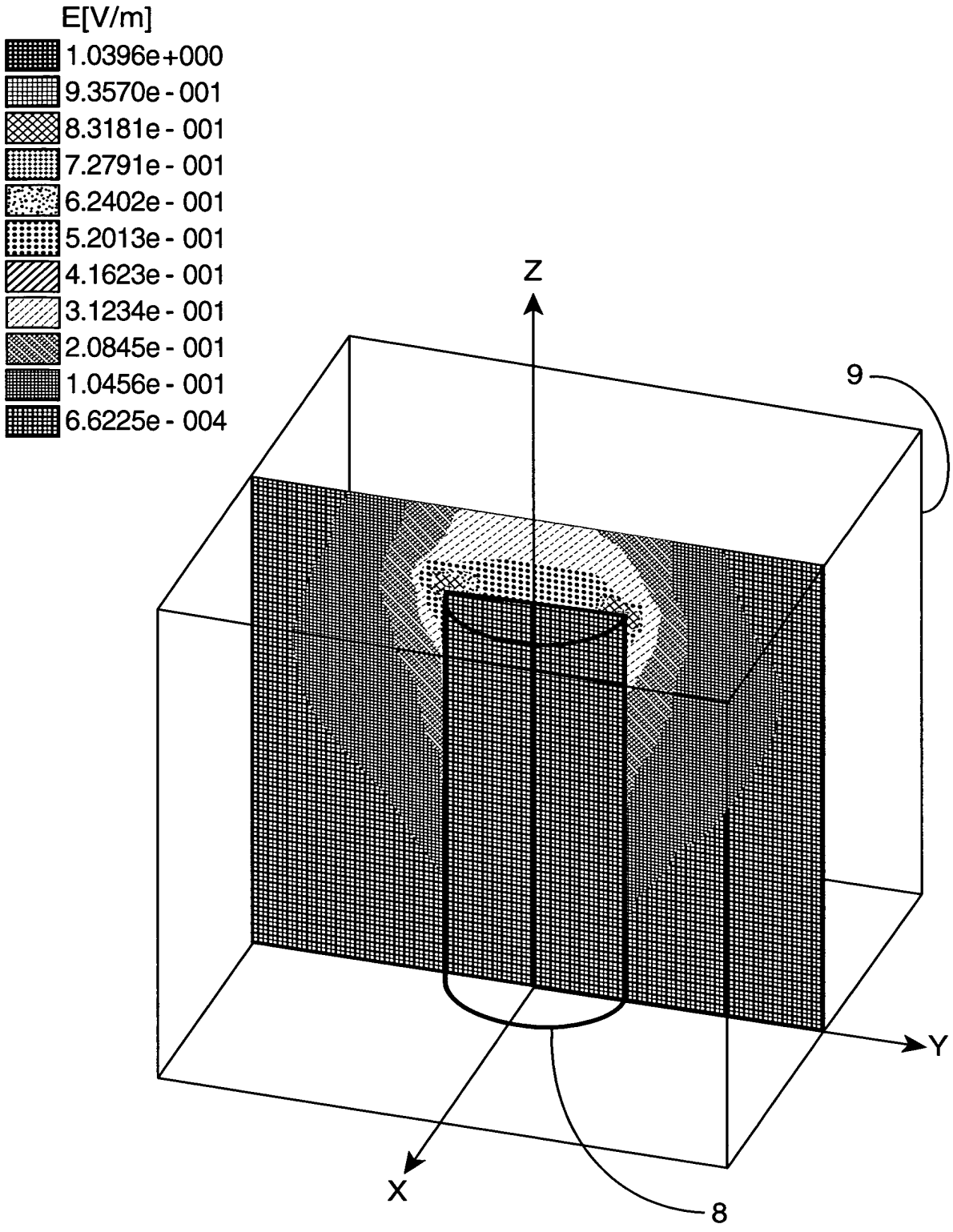


FIG. 1C
PRIOR ART

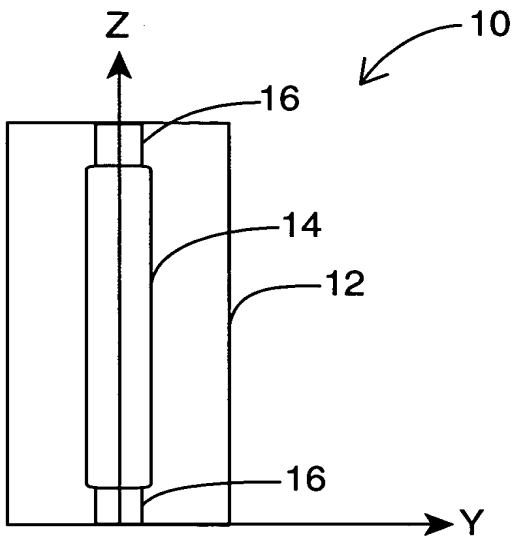


FIG. 2A

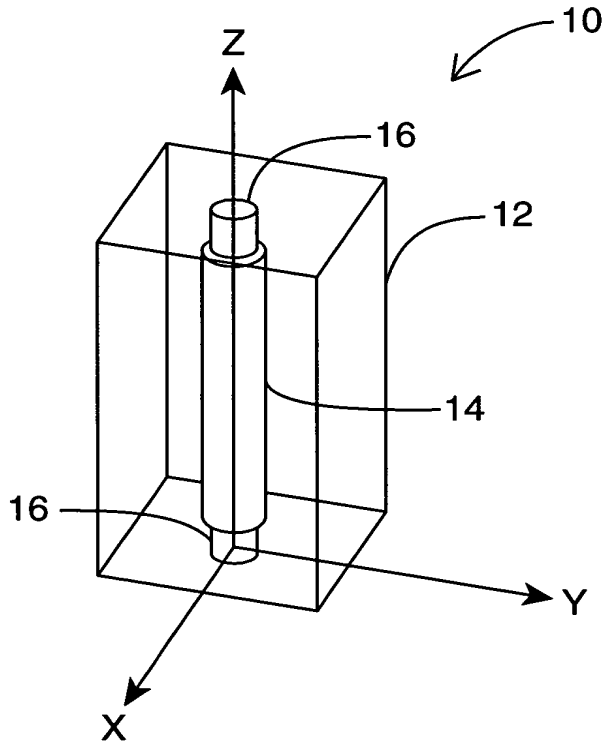


FIG. 2B

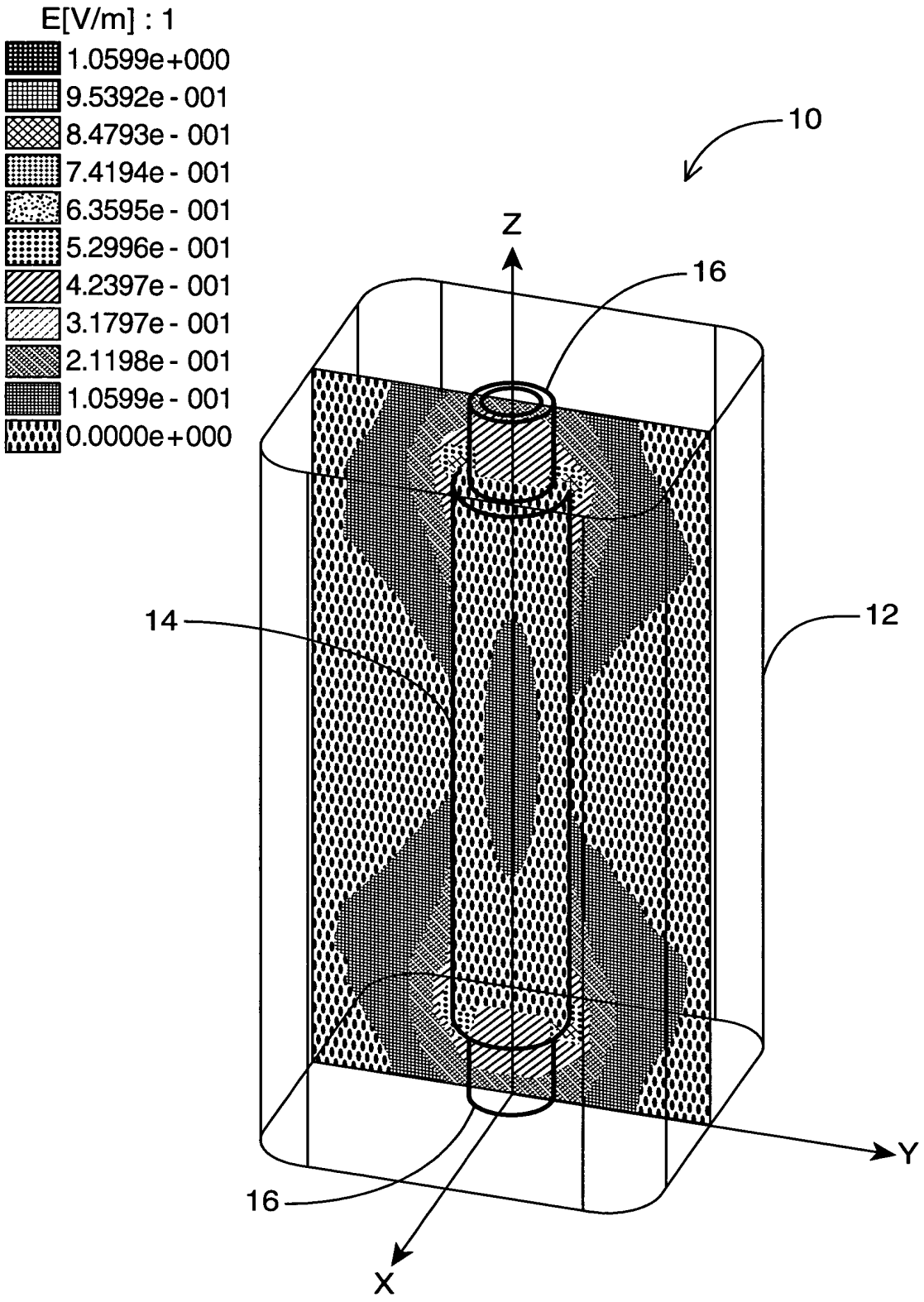

E[V/m] : 1
1.0599e+000
9.5392e - 001
8.4793e - 001
7.4194e - 001
6.3595e - 001
5.2996e - 001
4.2397e - 001
3.1797e - 001
2.1198e - 001
1.0599e - 001
0.0000e+000
10
Z
16
14
12
16
Y
X

FIG. 2C

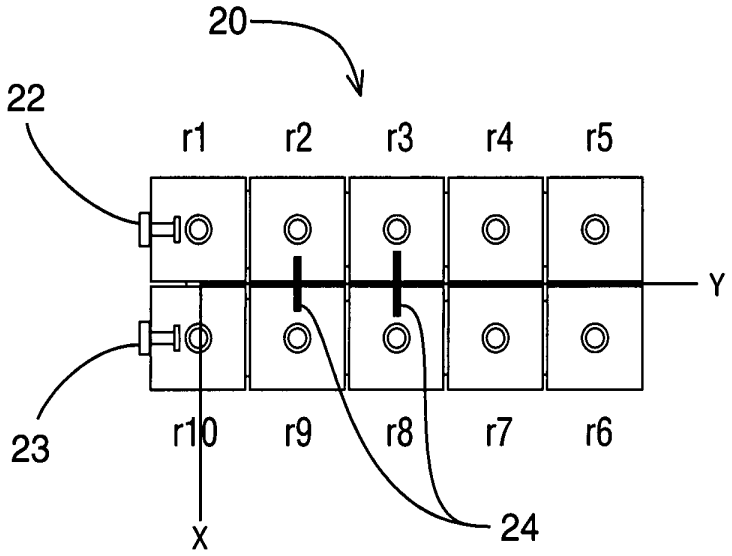


FIG. 3A

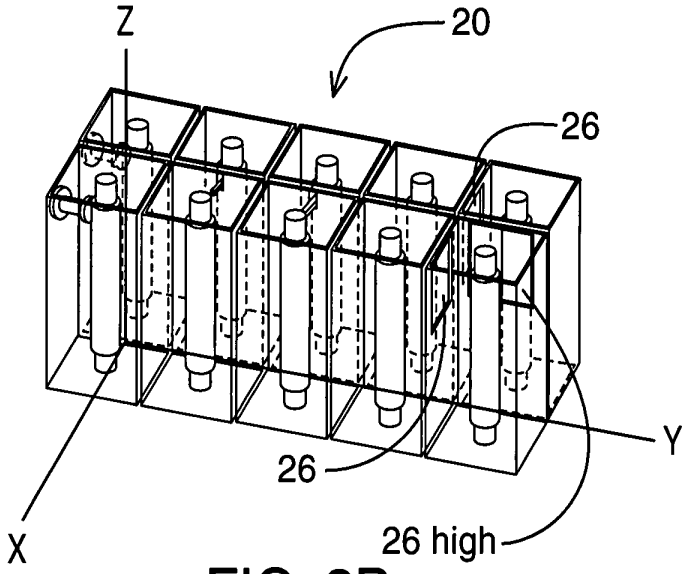


FIG. 3B

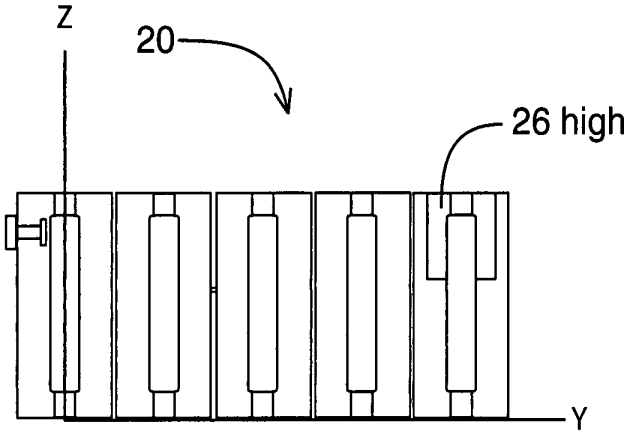


FIG. 3C

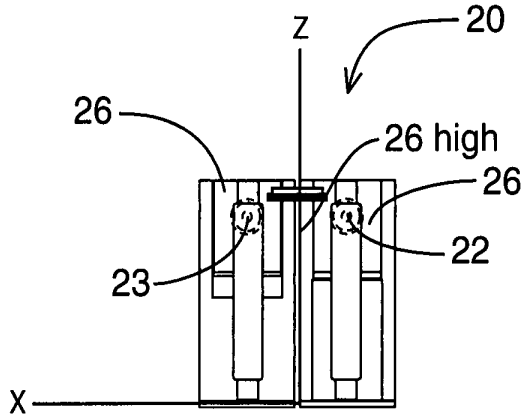


FIG. 3D

FIG. 4A

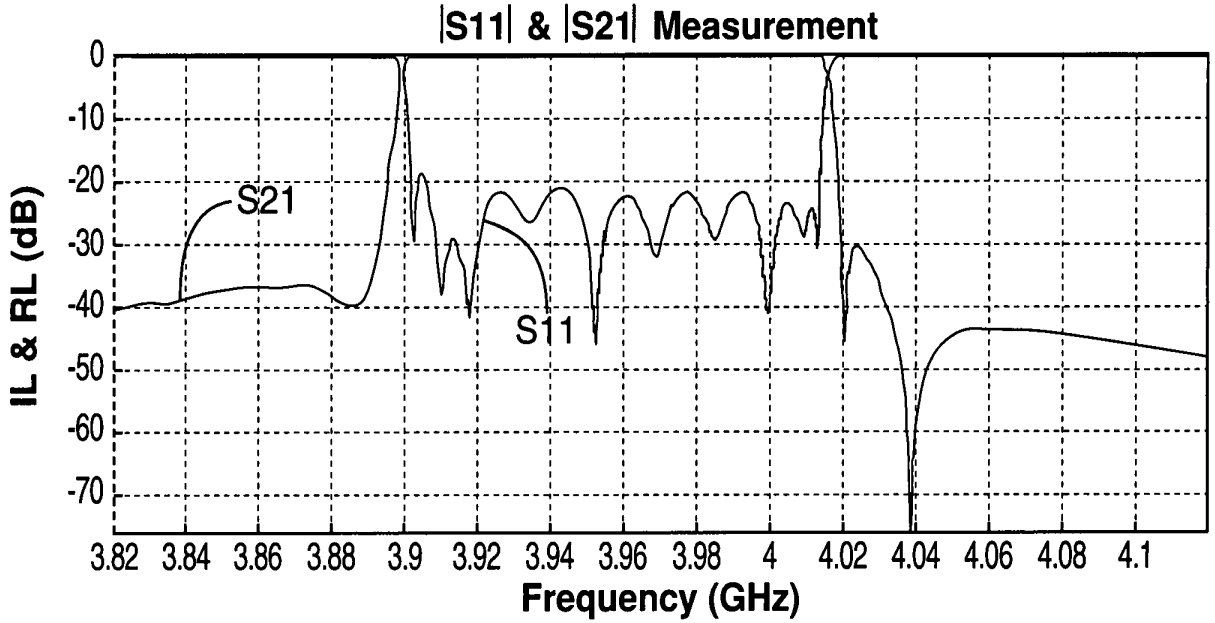
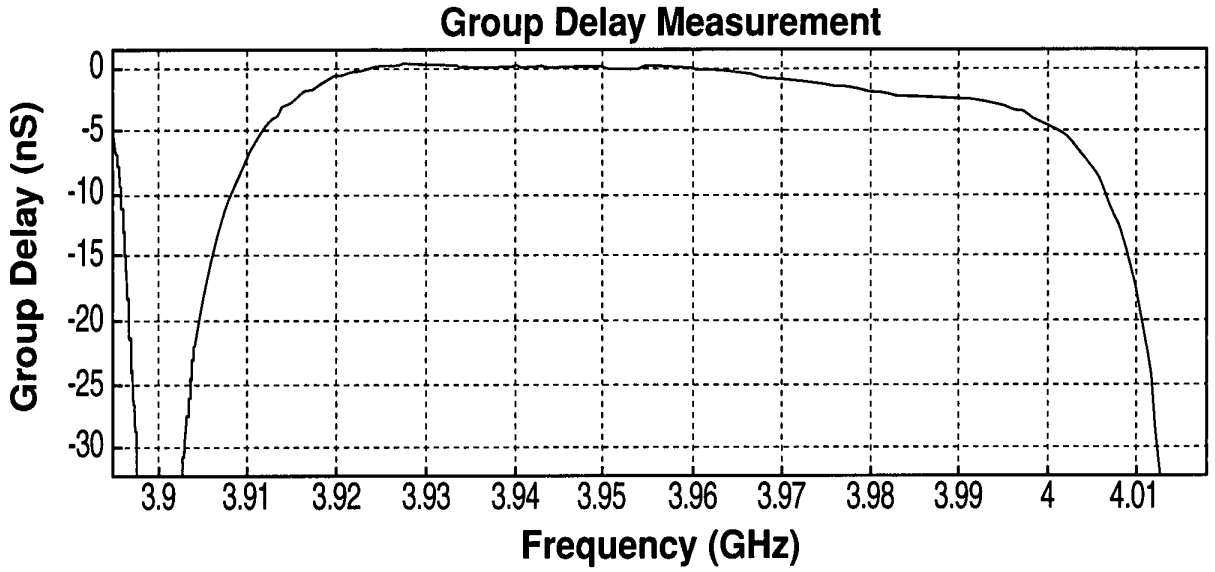

|S11| & |S21| Measurement
IL & RL (dB)
0
-10
-20
-30
-40
-50
-60
-70
S21
S11
3.82 3.84 3.86 3.88 3.9 3.92 3.94 3.96 3.98 4 4.02 4.04 4.06 4.08 4.1
Frequency (GHz)

FIG. 4B


Group Delay Measurement
Group Delay (nS)
0
-5
-10
-15
-20
-25
-30
3.9 3.91 3.92 3.93 3.94 3.95 3.96 3.97 3.98 3.99 4 4.01
Frequency (GHz)

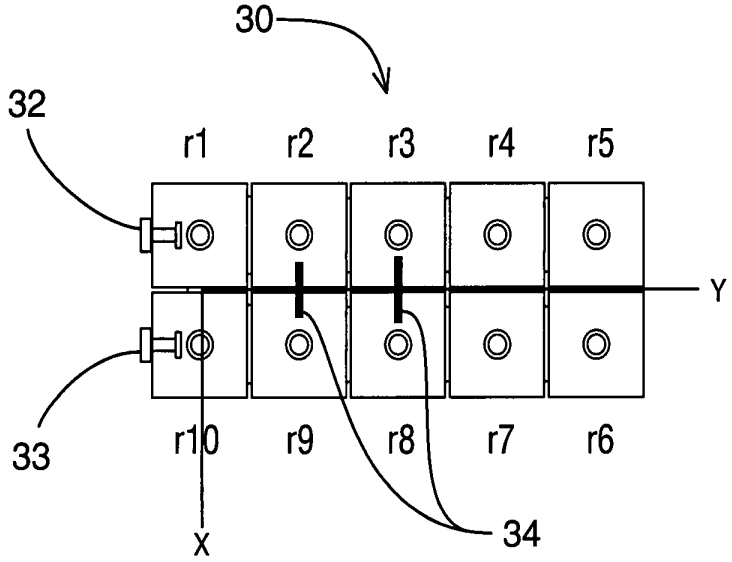


FIG. 5A

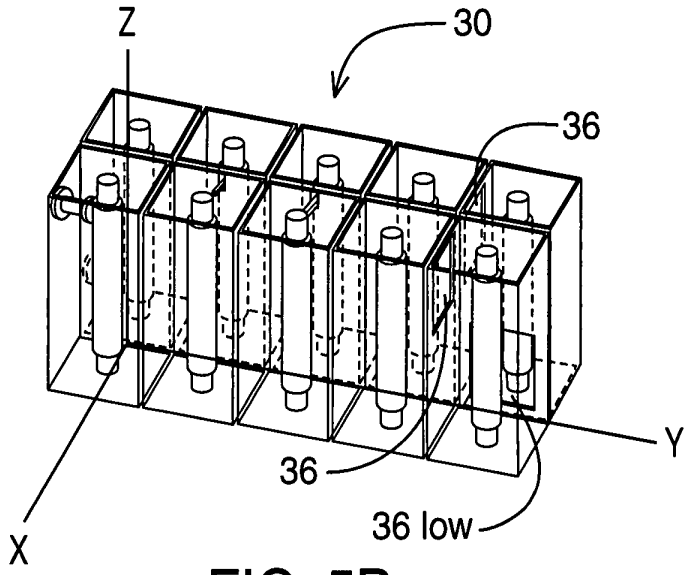


FIG. 5B

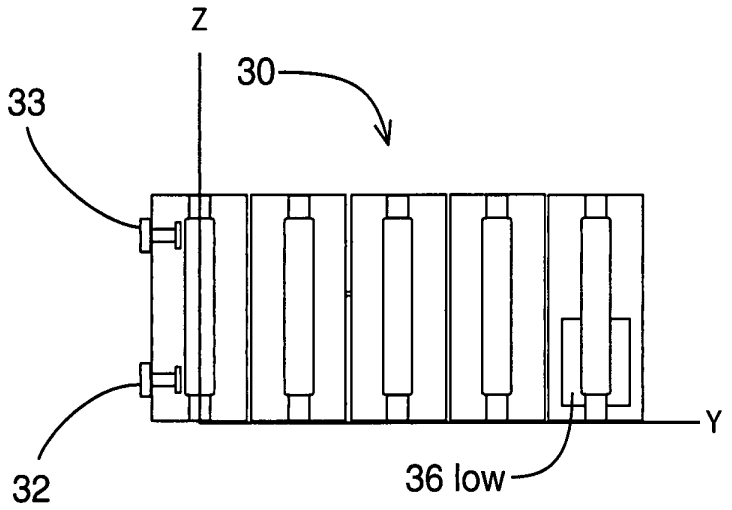


FIG. 5C

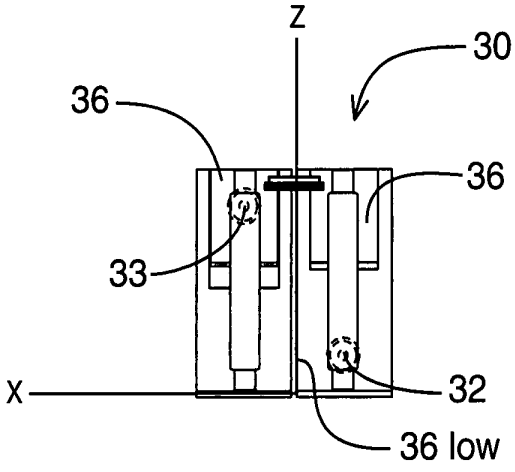


FIG. 5D

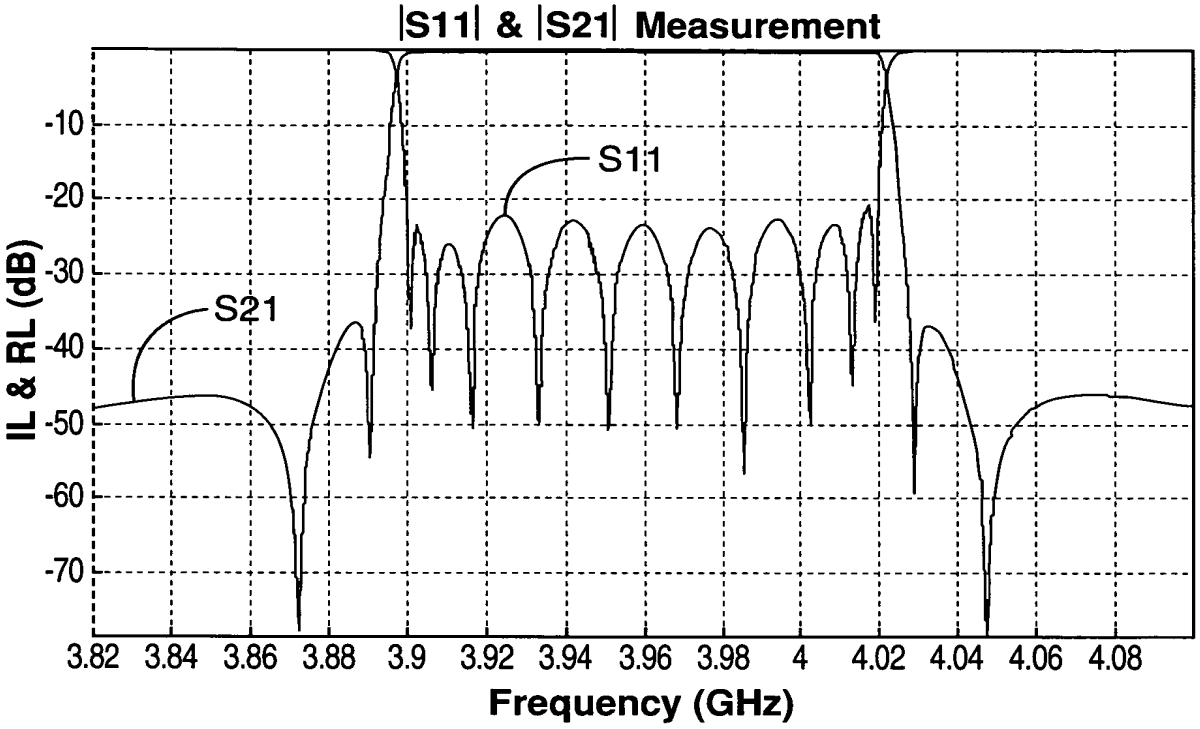

|S11| & |S21| Measurement
S11
S21
IL & RL (dB)
-10
-20
-30
-40
-50
-60
-70
3.82 3.84 3.86 3.88 3.9 3.92 3.94 3.96 3.98 4 4.02 4.04 4.06 4.08
Frequency (GHz)

FIG. 6A

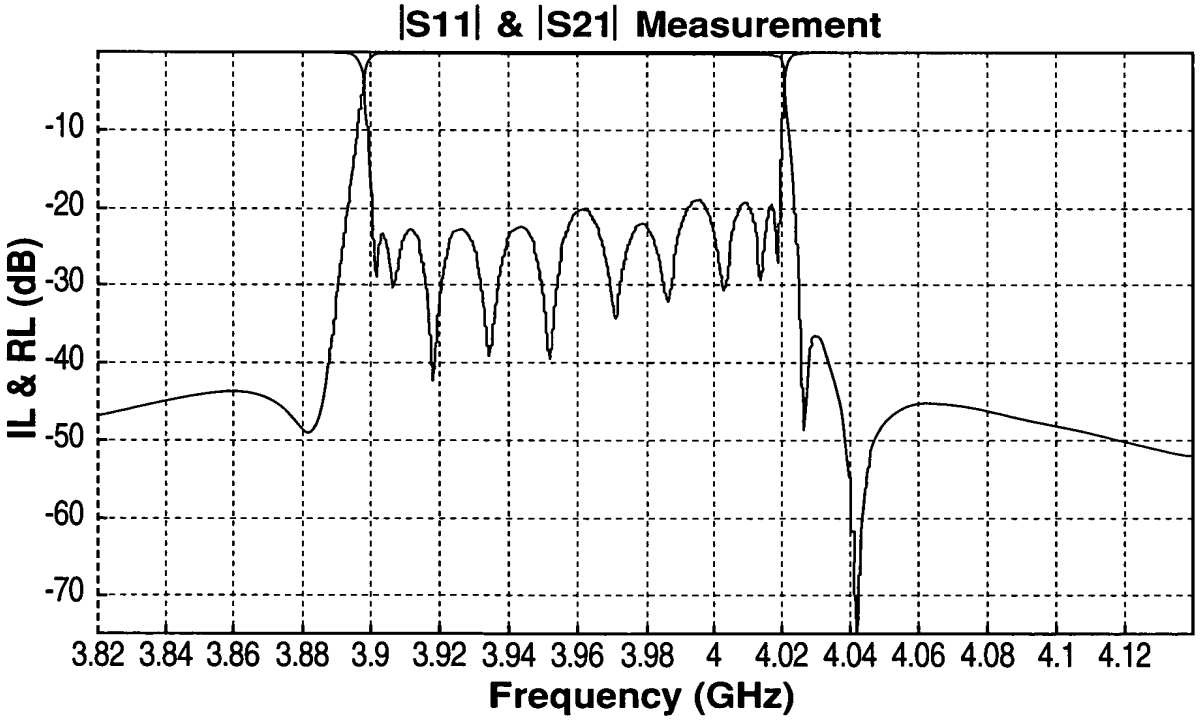

|S11| & |S21| Measurement
IL & RL (dB)
-10
-20
-30
-40
-50
-60
-70
3.82 3.84 3.86 3.88 3.9 3.92 3.94 3.96 3.98 4 4.02 4.04 4.06 4.08 4.1 4.12
Frequency (GHz)

FIG. 6B

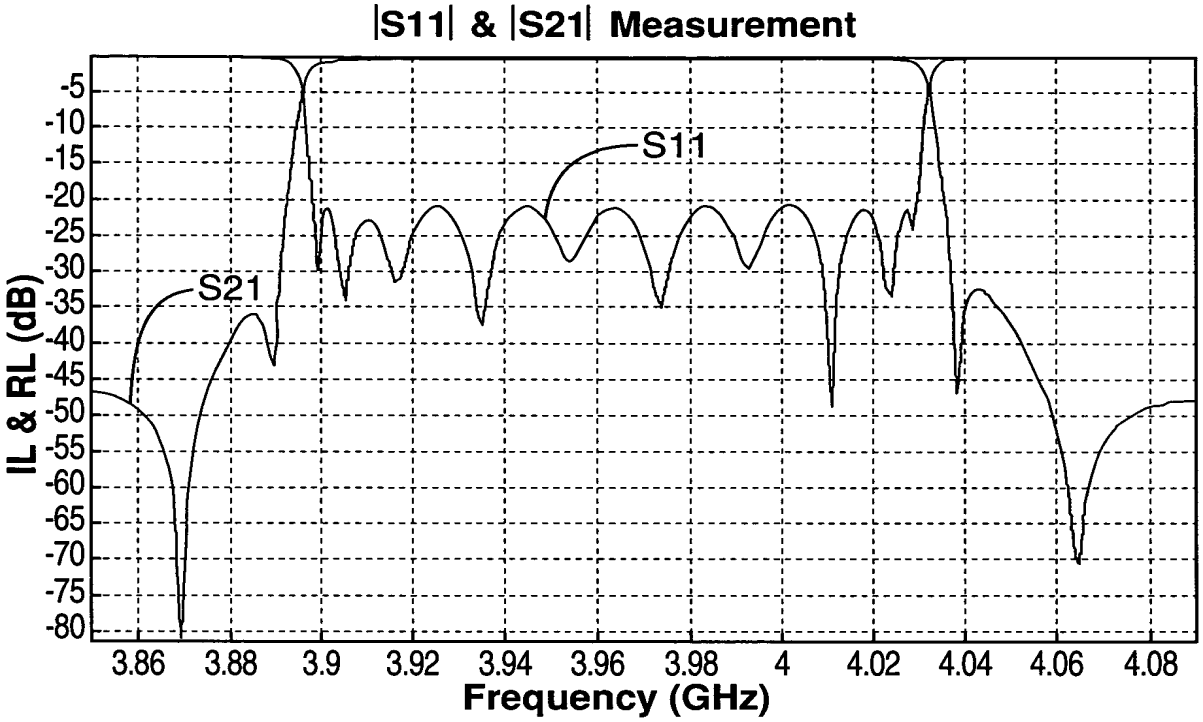

|S11| & |S21| Measurement
S11
S21
IL & RL (dB)
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
-80
3.86
3.88
3.9
3.92
3.94
3.96
3.98
4
4.02
4.04
4.06
4.08
Frequency (GHz)

FIG. 7A

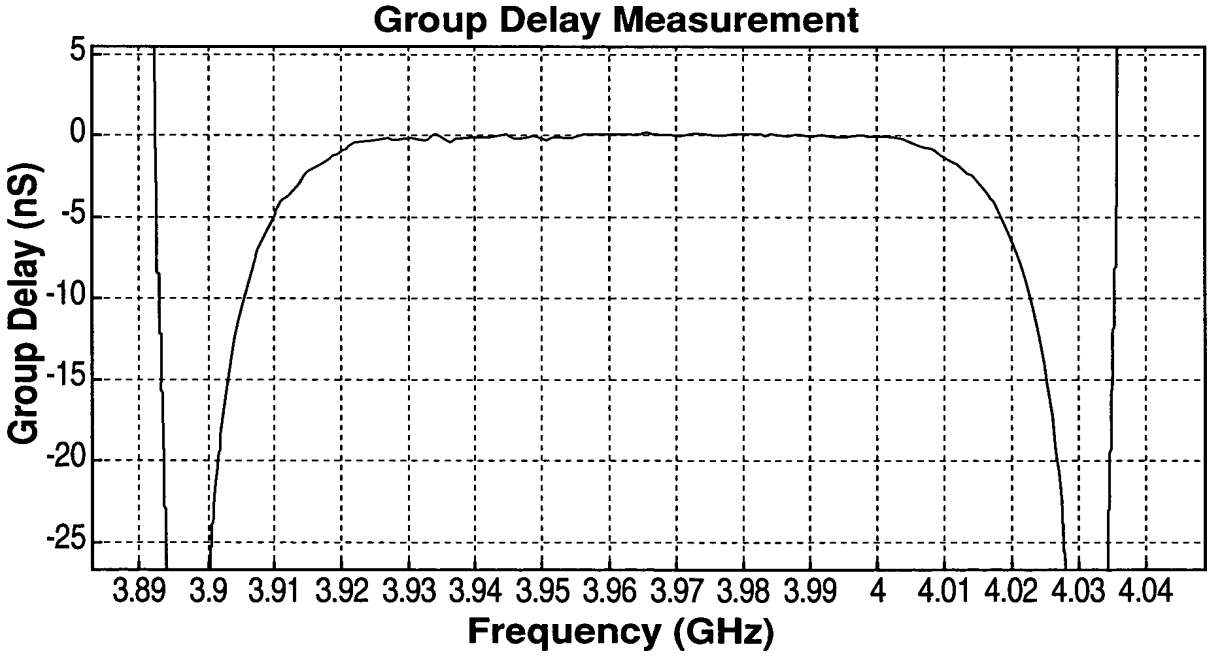

Group Delay Measurement
Group Delay (nS)
5
0
-5
-10
-15
-20
-25
3.89
3.9
3.91
3.92
3.93
3.94
3.95
3.96
3.97
3.98
3.99
4
4.01
4.02
4.03
4.04
Frequency (GHz)

FIG. 7B

FIG. 8A

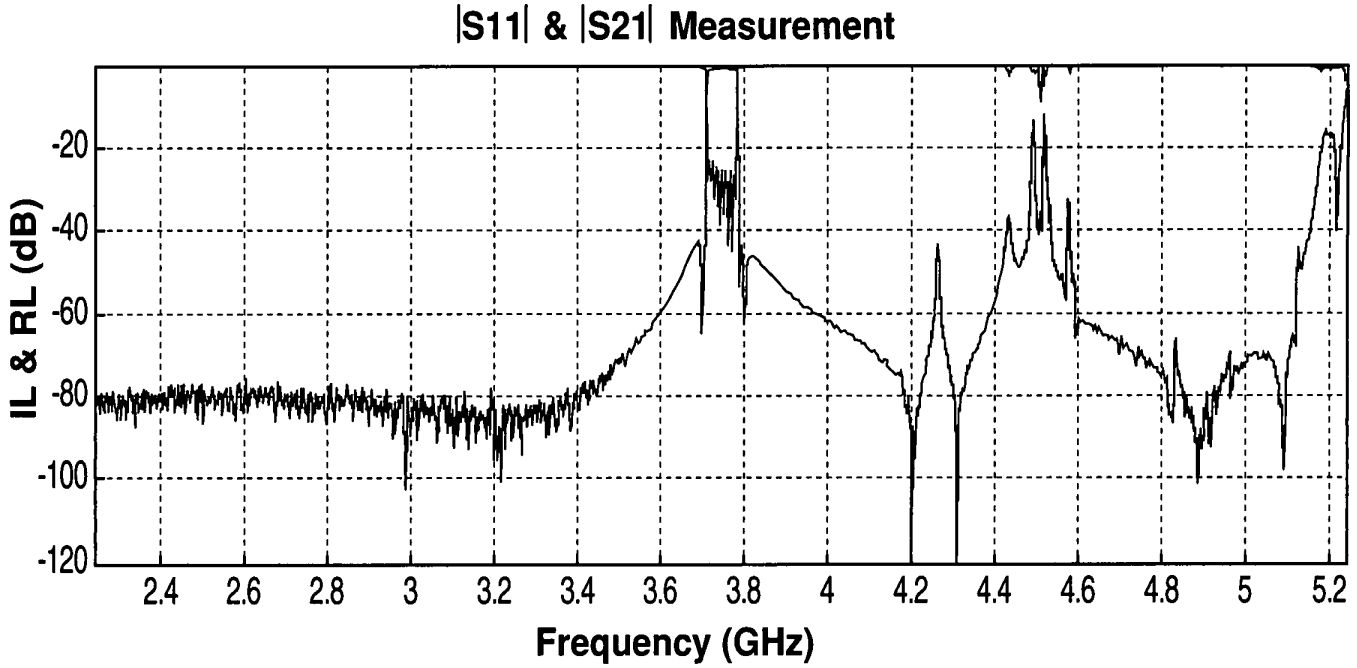
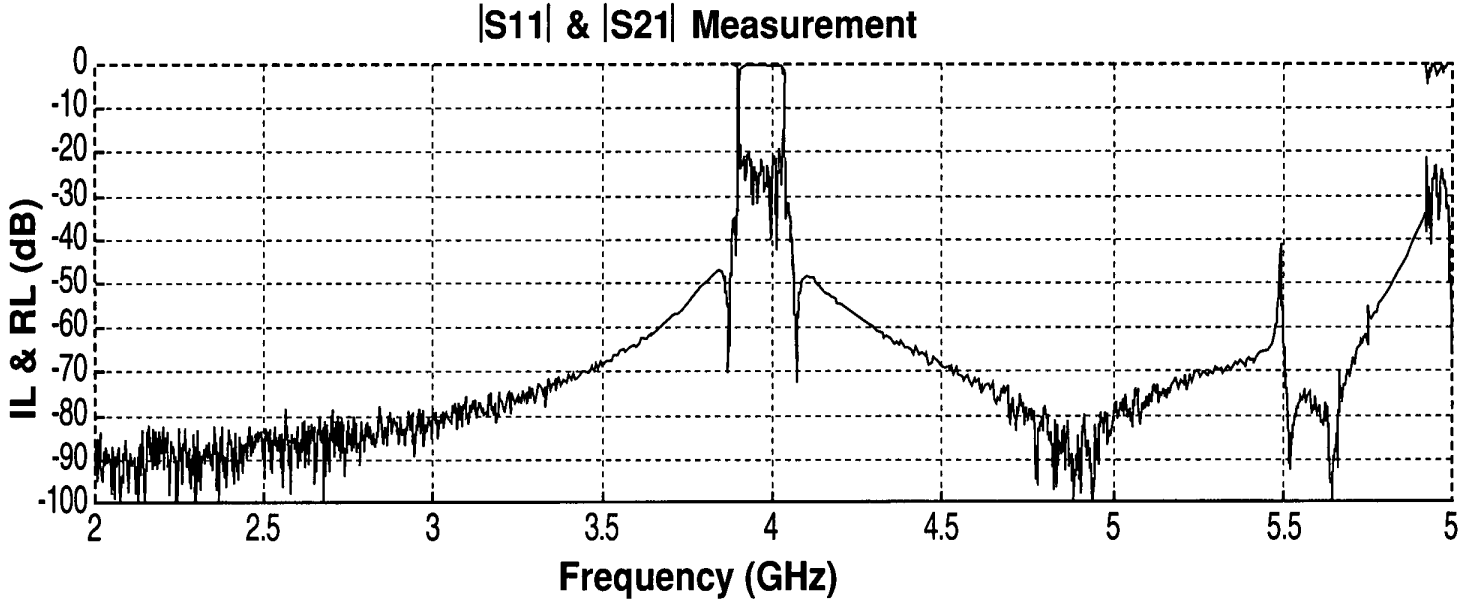

|S11| & |S21| Measurement
IL & RL (dB)
-20
-40
-60
-80
-100
-120
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
Frequency (GHz)

FIG. 8B


|S11| & |S21| Measurement
IL & RL (dB)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
2
2.5
3
3.5
4
4.5
5
5.5
5
Frequency (GHz)